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INL Ph.D.s volunteer time at Idaho's Cascade High School

An outdoor classroom with a student-teacher ratio of 3:1, including Idaho Science Teacher of the Year, and assisted by two scientists from the U.S. Department of Energy's Idaho National Laboratory, would seem to be the setting for a pretty good learning environment.

And that's exactly what 15 students from the 123-student-strong Cascade High School are receiving in their quest to find a unique microorganism in hot springs near this small logging community 80 miles north of Boise.

This instruction began in 1999, when Cascade High School science teacher Clint Kennedy called INL scientist Frank Roberto asking for help in trying to isolate a thermophilic bacteria called Thermus from Vulcan Hot Springs. Thermophile is a term used to describe microorganisms that live in very hot temperatures. DNA sequencing can be used to characterize novel thermophiles and compare them to a national database to determine if a unique microorganism has been found.

The phone call led to a group of 12 of Kennedy's students coming to the INL for eight weeks to participate with Roberto and other staff members in a hands-on science learning experience called a Science Action Team.

At the end of the summer, after not being able to identify the bacteria, Kennedy and his students returned to Cascade. Roberto didn't hear from them again until he and Kennedy attended the same Idaho Academy of Science meeting in Pocatello in 2003. Learning that the students were still trying to determine if the organism they had found at Vulcan Hot Springs was indeed unique, Roberto enlisted the help of fellow researcher Deborah Newby to help bring resolution to the class's problems. Roberto and Newby were already doing similar research in Yellowstone National Park and it seemed natural for them to play the role of visiting professors to help Kennedy and his students at Cascade.

The result has been two trips from Idaho Falls to Cascade and many volunteer hours by Roberto and Newby to help the students in their quest for previously undiscovered bacteria. On one field trip in particular, the students showed up on a Friday at 8 a.m., after the school year had ended. The group included two seniors who had already graduated.

"I have a firm belief that doing real-life science is essential to science education and our future as a nation," Kennedy said. "We have to find ways to let students experience authentic life science because that is what motivates them to continue in the field of science."

"The bottom line is when you're doing lab work, you need some hands-on assistance," Roberto said. "You can find a lot of information on the web and in books, but it's the hands on work that makes an experimentalist."

Roberto and Newby are strong believers in taking their expertise and experience to the classroom. The two have shared their skills with elementary, junior and senior high schools, science and engineering expos, Hispanic Youth Symposium, Super Science Seminars at the INL Scholastic Tournament, and at the National Science Bowl in Washington, D.C.

"If you have a passion for a subject area, you want to share that," Newby said. "It's been a good thing and rewarding to see the excitement of the kids, and I think that's part of the responsibility of being a scientist."

The work between the INL and Cascade High School will continue until Kennedy and the students can identify the organism. Newby says that once the students isolate the bacteria, they will be able to deposit the DNA sequence in the national sequence database (GenBank) where it will be available to other researchers. If the sequence of the Cascade bacterium is unique, they're hoping officials opt for a name – possibly something like Thermus Cascade-iensis.

"What little bit we can do to help them scientifically and to the next level is the least we owe to the kids of Idaho," Roberto said. "And what Clint Kennedy is doing with his class is far beyond just talking about it. They're doing the science."

The INL is a science-based, applied engineering national laboratory dedicated to supporting the U.S. Department of Energy's missions in energy, national security, science and environment. The INL is operated for the DOE by Battelle Energy Alliance.

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